REPORTS

ON THE

WASHINGTON SILVER MINE

IN

DAVIDSON COUNTY,

NORTH CAROLINA.

BY RICHARD C. TAYLOR.

WITH

AN APPENDIX,

CONTAINING ASSAYS OF THE ORES.

RETURNS OF SILVER AND GOLD PRODUCED,

AND STATEMENTS OF THE AFFAIRS

OF THE

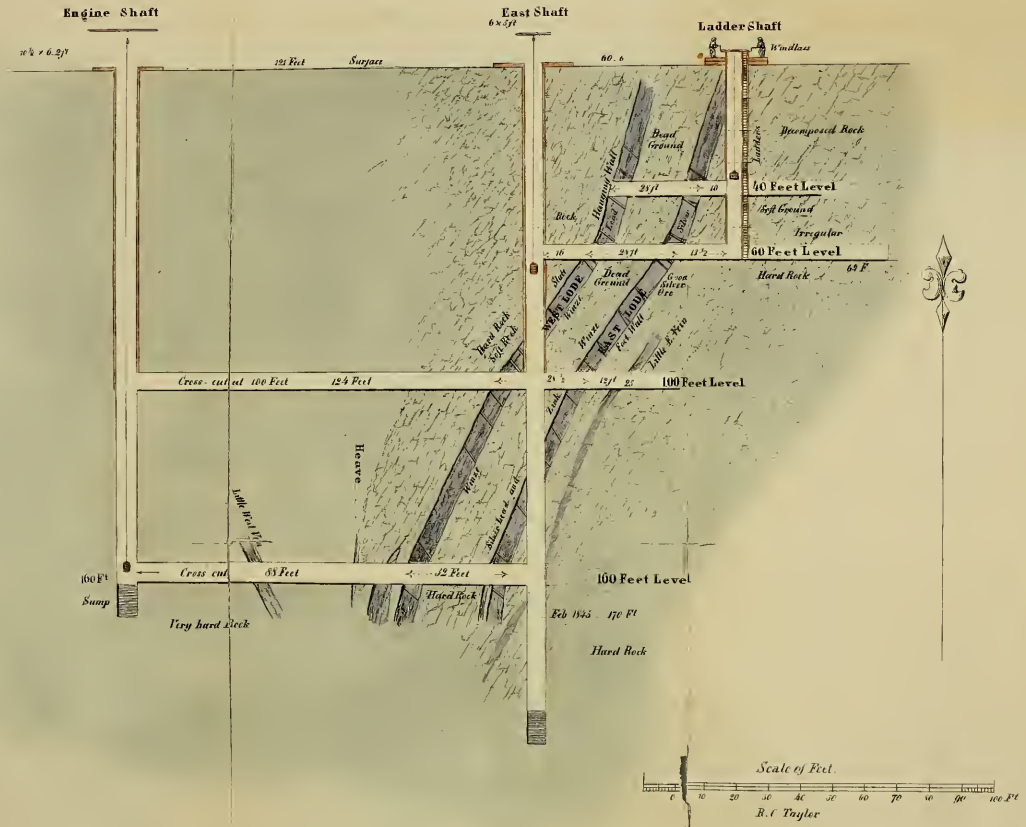
WASHINGTON MINING COMPANY.

PHILADELPHIA:

E. G. DORSEY, PRINTER, LIBRARY STREET.

1845.

VERTICAL SECTION OF THE WASHINGTON SILVER MINE, NORTH CAROLINA



Digitized by the Internet Archive
in 2010 with funding from
Lyrasis Members and Sloan Foundation

http://www.archive.org/details/reportsonwashing00tayl

REPORTS

ON THE

WASHINGTON SILVER MINE

IN

DAVIDSON COUNTY,

NORTH CAROLINA.

BY RICHARD C. TAYLOR.

WITH

AN APPENDIX,

CONTAINING ASSAYS OF THE ORES,

RETURNS OF SILVER AND GOLD PRODUCED,

AND STATEMENTS OF THE AFFAIRS

OF THE

WASHINGTON MINING COMPANY.

PHILADELPHIA:

E. G. DORSEY, PRINTER, LIBRARY STREET.

1845.

REPORT

ON THE

WASHINGTON SILVER MINE.

To William Blackburne, Esq.
President of the Washington Mining Company.

Sir,

In conformity with the instructions of your Board of Directors, dated Philadelphia, January 23d, 1845, requesting me "to make a regular geological survey of the mine, and a full report of the same to the company," I immediately proceeded into North Carolina, and have been actively engaged in an examination of the mine. My time has been so constantly occupied in collecting the essential data to enable me to arrive at correct conclusions thereon, and to acquire matter for the desired report on the present condition and future prospects of the mine, that I can do little more in the present communication, than state the general result of those observations. I leave, as I suggested previously to my coming hither, the separate details which I have thus brought together, for the subject of a supplemental communication; when the various drawings, sections, plans, and the requisite descriptive matter shall be completed, and when I shall be enabled, at the earliest moment, to hand them to you.

Since the commencement of my survey, I have examined every part of the mine, not omitting the slightest portion or corner of the workings. I have taken the requisite admeasurements, and have acquired all the data for making ground

plans and sections of the mine, at every level and working point. I have examined, with particular attention, the circumstances attending the interruption of the lodes, both to the north and the south,—so far as the excavations have been yet carried,—with the expectation of elucidating the extent of the lateral heaves, and the probable positions at which the continuity of the mineral veins or lodes may be expected to be resumed. I may observe here, that it does not appear that, heretofore, any especial attention or labour has been directed to the development of this latter all important circumstance. That such an investigation should be made without further delay, is not only my own confident opinion and recommendation, but, I have reason to believe, it is advocated by parties most experienced in mining economy, now and recently connected with the Washington mine.

Limiting my remarks, however, to the mineral area as it now is, and as it is thus far thoroughly developed, I proceed, with much satisfaction, to the observations which follow.

It would be injustice to you, and to the interests of the Washington Mining Company whom you represent, were I to withhold the expressions of gratification which the recent investigation enables me, unreservedly, to offer. No site which I have had an opportunity of inspecting within the United States, is better entitled to the appellation of a good and promising mine than this.

Of the productive results furnished by this mine during the past years, you are in possession of far more abundant information than I can possibly collect here. The resources thus far drawn from the mine are, I trust, but the commencement of a still more prosperous condition of things, and the earnest of future increased profits. It has been, however, my object, not so much to ascertain what has been already produced, and under what circumstances, as to satisfy myself and you with regard to what is before us, and how much of profitable materials remains untouched in the mine, and what we may prudently anticipate is yet in store of profitable working, for a long period to come. To this end have my enquiries been mainly directed.

Like every mine, probably, in the world, the size or capa-

city, the value and contents, of the two main lodes at this place, are unequal, and constantly fluctuating. Sometimes they thin off to a mere unprofitable trace, for a space, and again they expand into considerable breadths, occupying large cavities or vugs, and yielding good returns. Thus, the same vein ranges in magnitude, from a minimum of two or three inches of mineral matter, to ten or twelve feet. My impression now is, that, taking the entire areas or contents of the two veins, from the surface down to near 170 feet, their mineral capacity has greatly enlarged, and that this tendency is decidedly in progress at the lower depths. Whether the productive value of the extracted minerals proceeds on an equally advancing ratio, I am not fully supplied with data to enable me to be precise. Yet so convinced am I that the rate of production increases as we descend to the lower part of the mine, that I believe I am borne out in asserting that,—taking the mining returns in their full and extended sense,—it *does* so advance.

A considerable change or modification of the character of both the lodes is apparent in their lower portions. This was to be expected; and it is probable that yet further modifications will be developed as we descend. At the deepest point to which the excavations now are carried, both the veins are divided, southward of the shaft, by an irregular hard rock, rising up longitudinally in their centres. That which occurs in the west lode, is already very large. In one place, near the main cross-cut, it is several feet thick, while the mineral matter of the lode, on either side, is *increased* rather than diminished. A large portion of this mineral consists of very hard zink, with which an uncertain amount of lead and silver is intermixed. The aspect of this mass of dark coloured mineral matter, seems to denote the action of heat; since not only is the mineral porous, open, and spongy, like scoria, but it is remarkably twisted and contorted. The walls, at the same time, are broken into irregular cavities or "vugs," subsequently occupied by this black mineral aggregation; at one point to the breadth of twelve to fifteen feet. Northward of the cross-cut this lode is abruptly cut off by the heave which presents a face of solid rock.

It must not be taken for granted that this accession of mine-

ral material is equally rich or productive, in the aggregate, here, as in some other parts of the mine, where local deposits of extreme value have occasionally presented themselves. The black or dark blue ore of the west lode is, in some portions of it, wholly composed of hard, refractory, and worthless sulphuret of zink. In others, it contains veins of lead, intermixed with the compact zink, and also comprises silver, and, occasionally, some gold. Taken in the entire mass, the assay or yield is, perhaps, of no remarkable value; but when selected, the results are sufficiently rich to constitute a very profitable mine. Were there more lead to flux this mass, a larger return of the precious metal would be the result.

We revert then to the suggestion already made, as to the probable character of the veins when a further sinking of some forty or fifty feet of the water shaft shall have been effected. We have no apprehension but that a still larger amount of mineral matter would be then presented in the lodes; that is to say, that those lodes would continue to increase in thickness. The *west vein* may then, perhaps, be exhibited in the form of two distinct parts, separated by hard rock, of several feet thickness. The tendency of the *east vein*, towards the south, approximates to a similar character, but less decisively.

It were fruitless to speculate now on the mineral value of the contents of these enlarged lodes, at this extreme low stage. At the same time we cannot hesitate to say, that there exists no foundation for the supposition that that productive value would be, in any way, intrinsically less than the portion which is now accessible and before us, or that the permanent character of the mine will, in the slightest degree, be depreciated, notwithstanding, that by the converging of the two lines of heave, the veins are contracted longitudinally.

Extravagant calculations, founded on the analysis of small portions of the contents of a mineral lode, or upon selected fragments handed to the assayer, ought especially to be deprecated, as being, in the long run, highly injurious to the interest of every party concerned. If the attainment of simple truths be desirable in the ordinary transactions of life, how especially is it essential with relation to the business of mining. It is

from the average proceeds of large quantities of metalliferous substances, that any thing like safe data can be obtained, by which to estimate the permanent value of the mine. The experience, therefore, of three or six months furnace operations, will be of far more service towards arriving at this desirable result, than what is inferred from the minor investigations of the laboratory, however scientifically conducted.

From what has been said, it will be apparent, that, limiting our calculation to the spaces between the north and the south heaves, say from 100 to 150 feet in extent, this area will, in all probability, continue to be permanently productive in valuable ores, and will, doubtless, at least equal what it has heretofore produced. There is still in the mine the greater bulk of the ores between the 100 and the 160 feet levels. Those from the 40 feet level, upwards, are only now in process of extraction, and are particularly serviceable at this time, owing to the large proportion of lead which they contain. The silver is at present wholly derived from the last sixty feet of the veins, particularly from the east lode. Details of all these matters will be laid before you at the earliest moment. The weekly results, of the smelting operations, you receive in due course from Mr. Greenfield.

As relates to more extended examinations, beyond the limits of the space now in work, I have urged the making some *surface* explorations, on the range of the worked veins, both to the north and the south of the present mine. Should these, or any of them, be successful in striking the prolongation of the lodes, as we have good reason to expect, a vast and most important accession to the resources of the Washington Mining Company must ensue.

I have urged also the desirableness of tracing from *below*, the direction of the lateral heave, and its extent to the east or to the west, as the case may be, with a view to regain the mineral veins which that heave has now intercepted. A clue to this undetermined fact is much wanted, inasmuch as the ascertainment of a circumstance, so interesting in connection with the prosperity of the mine, cannot be too soon known. Surface indications beyond this northern heave do announce

the prolongation of mineral matter in that direction, nor are we without similar traces to the south: but, at the period at which I am now writing, no material attempt to explore has been made, save at the original site of the mine.

Enough has been said under this head.

In justice to the present and former conductors of this establishment, it is but right to mention the excellence of all the works beneath the surface. Both the main engine shaft, the water shaft, and the ladder shaft, and the timbering of the various levels or galleries, have been completed in the most workmanlike and substantial manner, such as there are but few parallels, probably, in the United States.

The sinking of the middle or water shaft, should be early commenced. That of the engine shaft is matter of more mature deliberation, after completion of the former, since, eventually, the whole water of the mine will be discharged from this shaft. It may be remarked here, that the increased inclination of the rocks in descending, renders the point of intersection of the mineral veins, by the engine shaft, much deeper than the original calculation of 300 feet. At present, and for some time to come, the smaller, or water shaft, is abundantly competent to perform all the work of lifting both water and ore, for which it may be required, as only one-third of the whole quantity of water is yielded by this shaft. From the 100 to the 160 feet level, the inclination of the veins westward is as 1 in 2. So far as present indications enable us to form a judgment, the lodes are now approaching still nearer to the vertical position. Consequently, the engine shaft will, in future, if sunk lower, gain but slowly on the veins. There is no authority for the suggestion, which I have heard made, that the two veins are drawing towards each other. On the contrary, the space is slightly widening between them.

There is a small vein, in about the middle of the 160 feet main cross-cut, which traverses nearly at a right angle to the main veins, and may perhaps intersect the west lode to the south. Another small vein has been intersected by two cross-cuts leading eastward from the east lode on the 100 foot level. It contains both lead and silver.

The foregoing statements are all that occur to me, as being essential to communicate, until time permits me to prepare the more elaborate details for your inspection. I have much wished to avoid all exaggeration, and, with this feeling, may perhaps have said less than I might, and omitted matters which deserve more favourable notice. I have, however, proceeded under the conviction that too much caution is better than that, in yielding to the dictates of a sanguine desire for the prosperous issue of this enterprise, I should be led to hazard more than I can fully vouch for.

I am well assured that the mine, under its present able management, will be made remunerative to the stockholders, and amply repay the annual costs and expenditures therein. I wish to apply this observation solely to the present condition of things, and to the prospect with relation to all the existing circumstances. So far I feel quite safe, in maintaining that opinion, and to that extent I desire to limit the expression. How soon it may be in a condition to pay off all old debts, contracted for the legitimate advantage of the mine, must, I conceive, be reserved for the consideration of other parties than myself, and I believe I am not called upon to enter into a question to which your annual reports furnish a better reply than is now in my power to give.

I am well aware of the professional responsibility of the task which you have confided to me, and trust, that in the remarks which have been made above, you will credit the author with a sincere desire to arrive at the most correct and impartial conclusions.

Whatever omissions, from the pressure of time, occur in this communication, I will endeavour to supply on the earliest occasion, and meanwhile, I am,

Your obedient servant,

Richard C. Taylor.

Washington Mine, North Carolina,
February 3d, 1845.

SUPPLEMENTARY REPORT.

In conformity with the plan suggested in the previous report to the Washington Mining Company, the following details are now supplied. They are accompanied by ground plans of the entire workings of the mine at the sixty feet level, the hundred feet level, and the one hundred and sixty feet level; and by a vertical diagram or section of the whole mine, from the surface down to the depth of 170 feet.

Site of the Mining Establishment.

Few places can be pointed out which present superior advantages as regards surface, aspect, cleanliness, drainage, and general convenience for business operations. It occupies a small rise or hill, having a gentle and uniform slope towards every point. An inclosure, including six acres, in a parallelogram, is surrounded by a board fence seven or eight feet high. The various working establishments, the mine, smelting and roasting furnaces, mechanics' shops, coal-houses, crushing, bucking and washing-houses, shaft-houses, office, laboratory, officers' dwellings, and other essential buildings, are included within this inclosure. The miners' houses, store, school-house, stables, &c., are arranged externally around this establishment, forming in the whole an aggregate of sixty buildings. There is no engine at work at present, but the company are in negotiation for the purchase of one of adequate power. The small quantity of water daily accumulated in the mine, has not rendered this expense immediately necessary.

I will only add, under this head, that a better organization of every department, more order and decorum among the operatives, and more systematic arrangement, as regards the

combined duties of all, can seldom be met with. This is saying no more than is strictly due to those whose merit it is to have effected and maintained these desirable arrangements.

THE WORKS.

Under this head it is not necessary to observe any particular order, and we will, therefore, notice as first in point of date and construction on this ground,

The Ladder Shaft.

This work, sunk on the original site at the discovery of the mine outcrop in 1838, gives access, by a series of ladders, to the forty feet and the sixty feet levels beneath. From thence other winze ladders descend on the backs of the veins or along the slope of the mineral lodes, to the hundred feet and the one hundred and sixty feet levels, still lower. The capacity of this shaft is six feet square, the materials being elevated by windlass.

The East or Upper Water Shaft.

The "sump" or cistern of this shaft was, at the time of my visit, sunk about eight feet lower than the 160 feet level. This, although a small shaft of only six feet by five feet, clear area, is of first rate importance to the working of the mine. It intersects the west lode at 90 feet, and the east lode at 140 feet, below the surface. At the present time, we believe it to be perfectly adequate to all the duty of raising, not only the water of the mine, but all the ore-stuff yet touched below the 40 feet level. It is situated 66 feet west of the ladder shaft, and 126 feet east of the engine shaft. This east shaft is, at the present moment, in progress of sinking some 40 or 50 feet lower than the 160 feet level. Of course, at its base, a cross-cut to the west, as proposed, will develope the condition of the mineral veins, under extremely interesting circumstances, as regards the future prospects of the mine.

It may be well to note here, that it has been customary to designate the two veins under the names of the north and the

south veins. See the Managers' Report, as appended, January 1st. In the present pages, we have ventured to depart from this practice, and to speak of the east and the west veins, as more consonant with geographical accuracy. For, inasmuch as the direction of these veins is only between 15 and 20 degrees from a true north and south meridian line, they cannot, with propriety, (avoiding unnecessary minuteness,) be denominated other than the east and the west veins. It is the more necessary to avoid a misunderstanding on this point, because the same course of stratification is preserved for at least a hundred miles in either direction, and is one of the most permanent geological features of the entire country.

The Engine Shaft

Has an area of 10 feet 6 inches, by 6 feet 2 inches, divided into three compartments. This, like the east shaft, is a good piece of mechanical work. It is of the most permanent character, and is capable of accommodating an amount of business on the largest probable scale. As we have already observed, this shaft was located on the calculation that the nearest lode would be intersected at about three hundred feet down. It has since resulted, that the increased inclination of the veins, together with that of the stratification generally, places the intersecting point much lower; consequently, the east shaft will continue, for awhile, to be most conveniently adapted for the economy of the mine.

The engine shaft has been sunk through a series of ancient stratified rocks, partly of the magnesian and talcose class, with blue and greenish chlorite slates, tremolite, and asbestiform rocks, iron pyrites, and here and there a small admixture of zink, and a very little lead and copper. No important stratum of quartz was cut through by these operations, although heavy masses sometimes occur in contact with the mineral lodes, and many beds of it traverse the neighbouring country. There are two cross-cuts or tunnels cut through the same series of rocks, and leading from shaft to shaft, at the 100 and the 160 feet levels.

For facilitating the further exploration of the mine, it is

found desirable to sink this shaft some eight or ten fathoms yet deeper, and from that depth to carry forward a third cross-cut to intersect the lodes, as well as the east shaft. When completed, this engine shaft will concentrate the whole water of the mine, to be elevated by steam power.

Amount of Water in the Mine.

To ascertain this, I guaged the barrels or buckets at each shaft, and registered the number of such buckets elevated within a given period, the results being as follows:

East Shaft.

The bucket was found to hold 71 gallons, of 221 cubic inches each; the drum making seven revolutions to each barrel, and having a diameter of eight feet. It was ascertained that the quantity of water to be discharged every 24 hours, in order to keep the mining operations perfectly dry, was 10,000 gallons, being at the rate of 140 barrels per day of 24 hours.

The Engine Shaft.

It is believed that the water which accumulates here is not derived immediately from the mine, but from the strata beyond it. Here 294 barrels, per 24 hours, were necessary to free the shaft of water, which amounts to 20,000 gallons in that time. The contents of each barrel was 68 gallons; the diameter of the drum is 10 feet, and it makes five revolutions in drawing up each bucket.

As regards the two shafts, therefore, the entire result may be taken at not more than 30,000 gallons of water, discharged from the mine in each day of 24 hours duration. This is equivalent to 1250 gallons per hour, and to 21 gallons per minute. The period of making these experiments was after a wet season, in the month of January. In the dry summer season, the flow of water, I am informed, is about 18 gallons a minute. This is a very small amount to be overcome.

As we have shown, the water from the engine shaft, as distinct from that of the mine, forms double the amount of that yielded by the latter. The cost of raising this surplus is

amply counterbalanced by its utility and convenience. In the first place, it furnishes the whole population of the establishment with excellent water for domestic purposes; and, in the next place, it is of great value for the purpose of washing the pulverized ores.

Washing the Ores.

Previous to the excellent arrangement now adopted, the ores were usually transported to the distance of a mile, and back again, at a cost much exceeding that of raising the water from the shafts. Now, this water is conveyed in wooden troughs into a circular reservoir, from whence a uniform and permanent supply can at all times be obtained for the different processes of washing the ores.

From the "bucking tables," the ore is placed in troughs, which descend by numerous stages to the washing-house; and here exhibits the value of the application of the drainage water. The ore is here sorted into three degrees of fineness, the finest having the consistence of mere slime, and the next quality, obtained by "jigging," is about the consistence of ordinary sand. The largest size, of the consistence of gravel, is removed to a side heap, whence, at some future day, it may be brought into value, through the means of a crushing mill. At present, the establishment does not possess a crushing machine of adequate power, worked by steam. It is now greatly needed here, to crush the inferior ores, especially the harder admixtures, of which there is a great accumulation, probably several thousand tons, lying upon the bank, which cannot be dressed by hand; yet, which the smelter informs me, is all capable of being worked up to fair profit.

THE LEVELS.

The Forty feet Level.

Descending the ladder shaft, we first reach the 40 feet level, and first obtain a view of the two lodes in position. From the hanging wall of the west lode, to the foot wall of the east lode, the distance is here 28 feet. The east vein crops out very

near the mouth of the shaft, which was commenced in the year 1838. It is 10 feet west of that shaft, at the depth of 40 feet, and we find that the inclination or underlie of both veins is about 60 degrees westward from horizontal. Of course, so near to the outcrop, no great regularity is maintained, either in the materials or in their position.

The prevailing appearance of the upper part of these lodes and their accompaniments, is that of a yellowish-white, soft, friable or decomposed talcose matter, varying from rock to rotten slate and soft clay, the mineral matter dispersed throughout which, is not readily distinguishable to the eye, and was, for a long time, scarcely recognised in the earlier stages of mining operations here.

This was the first point at which silver was suspected to prevail both in union with galena and in a native state. Here also, as I am informed, gold was detected in both lodes, and that to an extent which has not been equalled or excelled since. It will be observed, that the original researches which led to the discovery of this mine, were for gold alone, as there has been, from time to time, a great deal of that precious metal collected in this part of North Carolina. The greatest amount of silver has, heretofore, occurred in the east vein, and so marked was the character of each of the two mineral lodes, particularly in the space between the 40 to the 100 feet levels, that it has been customary to designate that on the east as the "silver vein," while that on the west is known by the "lead vein." The space between the veins is occupied by soft ground, in mining phraseology; that is to say, the rocks at that small distance from the surface, are in a decomposed state, and easily worked. As might be expected, traces of mineral matter are dispersed throughout this intermediate mass, although they are frequently so disguised as not to be readily distinguished by an unpractised eye.

The Sixty feet Level.

It was found, on admeasurement, that the space between the hanging wall of the west vein and the foot wall or "lying side" of the east vein, was exactly the same as in the 40 fee

level; that is to say, 28 feet. As in the former case, the intermediate matter consisted of "dead ground," soft, yet gradually hardening, or in more correct phraseology, less decomposed, at each stage of descent. We refer to our annexed ground plan of the veins and operations effected on this level. A peculiarly interesting geological fact is illustrated in this diagram. It exhibits a remarkable conjunction or approximation of the two mineral lodes; and had we not direct evidence to the contrary, by our diagrams both above and below this point, it would be difficult to reject the prevailing hypothesis, that the two veins here actually crossed each other or changed sides. The expansion of metalliferous matter, by this conjunction of the two veins, was considerable; or, to come to direct figures, was, at its widest part, no less than 20½ feet. It here gave valuable returns to the proprietors, and confirmed the correctness of the axiom that *the convergence or junction of mineral veins is a circumstance favourable to their enrichment.*

Notwithstanding the remark previously made respecting the greater prevalence of silver in the east vein, it was found that silver ore abounded most in the west lode at this point. A vein of manganese also occurred in the intermediate ground, as also did a deposite of good silver-lead ore. In the same west vein we also observed beautiful crystalline varieties of the phosphates and carbonates of lead. Some of the latter, so far as we know, and they have been compared with specimens in the richest European cabinets, are unique in form, and of superior beauty. Heavy and solid masses of carbonate of lead, and silicates and carbonate of copper, containing beautiful foliated native silver, were obtained between the 60 and the 100 feet levels. Advancing northward along the gallery of the east lode, an exploratory cross-cut of 64 feet in length has been made in an east direction. This cross-cut, by a singular chance, follows the line of a local upheave or anti-clinal axis. Its southern dip is about 70 degrees, and its direction is about N. 70° W., being a rectangular course to the range of the mineral vein. No metalliferous matter is exhibited along the direction of this axis, which confirms the views heretofore

entertained, that "*veins of fracture*" do not prevail in this country. Instead of mineral matter occupying the fissure produced by the anticlinal axis, we found, as we were prepared to expect, a thin seam of wet clay, occupying the "joint." The same feature is repeated, on the same level, at 83 feet north of this point.

The east lode has been excavated along a space of more than 300 feet in length. The western vein is not opened more than half that distance. In the former, about 200 hundred feet in length was eminently productive of argentiferous lead. Towards the northern and southern extremities of both veins, they are interrupted by heaves of rock, ranging obtusely to the lodes, and seemingly presenting a barrier to the further longitudinal continuity of their course. This local interruption to the general arrangement of the stratification has an important bearing on the future productive value of the mine, and will be adverted to in another place.

As regards the amount of excavation completed upon this level, it may be stated at 600 feet of galleries and cross-cuts, without including the area of the veins which has been almost entirely removed upwards.

The Hundred feet Level.

Including the main cross-cutting from the engine shaft to the east shaft, the amount of excavation on this level is 560 feet in length. Between the 60 and the 100 feet levels, there has been further extracted a solid area of from 1500 to 2000 cubical yards, or a superficial area of 10,400 feet of vein stuff.

In consequence of the westerly inclination of the stratified rocks and veins, the west lode, which, at the 60 feet level was 16 feet east of the water shaft, is here altogether on its western side, shewing thus that the dip or underlie is about 55 degrees from the horizon. The existence of a cross-course and heave, having a north-easterly range at the northern extremity of the mining operations, as heretofore pursued, and also of another heave traversing the strata in a south-east direction at the southern termination of the same workings, is now made apparent, beyond all doubt. Hence is determined another fact,

equally influential on the mine, that in proceeding downwards, the present mineral veins are necessarily more and more circumscribed and limited,—so far as we yet have information,—to the narrowing area of the included space. Consequently, the lodes are, laterally and longitudinally, greatly curtailed in area and extent. We shall render this definition more apparent by stating, that, while the two sides or "cheeks" of the cross-courses continue somewhere about vertical, and the pitch of the veins carry them to the westward, those veins are brought nearer and nearer into the point of intersection of the heaves. By this means, therefore, the length of the metalliferous lodes is necessarily diminished at every foot of descent, until it would seem that a period must arrive at which they will be shut out altogether. We are led to this conclusion from the appearances exhibited at the present moment; for we certainly derive no assistance from developments of a contrary tendency, and no attempt has yet been made to discover the prolongation of the veins on either boundary of the two barriers. In what direction the moving forces may have acted, whether the lateral motion has proceeded from the east or from the west, or on which hand to seek to regain the interrupted veins, we possess no clue. Instances have been found where a heave to the right or left has amounted to 80 feet. Yet are we justified in the expectation that this seeming mystery will be satisfactorily developed by the works now in progress. We think that the influence of this difficulty will cease after a few more fathoms of depth, and that then the veins will maintain their course undisturbed. We already see that these veins make up in magnitude and in the mass of their cubical contents, for what they are curtailed in length, and that they become more powerful as they descend. It is impossible to witness the increased volume of mineral matter here presented, and the permanent character which it now assumes, without a conviction that a still larger amount is concentrated at lower depths. It is also due to geological truth to say that I am aware of no instance where the mineral veins cease or are entirely interrupted by the accidental traversing of lines of fracture.

Our attention has been directed to another favourable indication. It consists in the presence of another vein, not previously noticed, containing ores of lead, silver and zink. This small lode, intersected by the lower cross-cut, does not appear to follow the parallelism of the two main veins, but to strike to meet them in a south-east direction, so that the point of intersection may possibly be that also of the heaves. Altogether, the next ensuing stage of the mining operations here, will be of the most interesting character.

We have also to add here, that the exploring excavations on this 100 feet level shows, that eastward of the lode we have designated as the main east lode, a small vein, containing the usual metalliferous materials of the adjacent veins, exists about 10 or 12 feet from the latter. *See the ground plan.*

On the west vein, between the 60 and the 100 feet levels, it expanded considerably, and yielded, in 1844, very rich silver ore. Here was obtained the massy carbonates of lead, and the brilliant, foliated and arborescent native silver ores. Below this 100 feet, the part of the same lode which had abounded in rich silver, narrowed downwards, until that variety of ore nearly terminated at 125 feet. The working result of the ore, composed of carbonates, was in the mass, about 30 per cent. of lead, comprising silver.

From 60 to 170 feet down, the ore of this west lode gradually assumed a different and more permanent character. Changing from the light coloured, the brownish-yellow ores of small specific gravity, in the upper portion of the mine, and thence from the beautifully crystallized varieties of carbonates of lead, and the splendid series of phosphates, above the 100 feet level, the nature and appearance of every mineral substance assume new features. Under this metamorphosis it becomes a black, porous, or spongiform ore; in great measure composed of zink and argentiferous galena. The admixture is unequal, for the zink now appears to predominate. It is still intermixed with virgin silver, but the smelter would gladly hail a larger amount of lead. As we descend, the lode expands to 10 or 15 feet between the walls, although it is in places not more than three feet. In these expanded portions the walls

are less regularly defined. They are frequently seen broken into "vugs, voughs," or cavities, occupied by valuable accumulations of mineral matter, as we have described in the first report.

Access from the upper levels down to this gallery is effected by means of winze ladders, and in the same way we descend down to the 160 feet level beneath.

The Hundred and Sixty feet Level.

At this point, owing to the pitch of the strata, the east lode is now seen a few feet west of the water shaft. The inclination is evidently increased, being at this point about 64 degrees from the horizon. Still further down, the underlie appears to tend yet more towards the vertical. The space from wall to wall of the two veins is here enlarged to 32 feet. In certain places the veins now attain to great breadth, expanding into nests or irregular cavities. In particular, the west vein now becomes wide, and in spots may be seen 10 or 15 feet thick, occupied with black, cavernous, steel-grained zinky ore, in which occurs masses of argentiferous lead, and arborescent, foliated, and filiform native silver, as well as a considerable quantity which exists in another form, combined with the galena. The assay of this black ore exhibits 49 to 52 per cent. of silver lead, which yields 50 ounces of silver to the ton of metal. Another variety, locally termed "the blue ore," is a dark argentiferous galena, unequally distributed through the gangue of the lode. Its recent assay, by Professor Booth, gave of lead, 38 per cent.

of silver, 2.875

40.875

We must not confound such an enormous result with the working average of the vein; we only introduce the fact as having actually occurred at one point. The actual tables or returns of lead, silver and gold, for the year 1844, will be the only safe guide towards an estimate of the general result.

We note here, that the assays of which we occasionally

make mention, are, in all cases, calculated on the ton of 2000 lbs. weight.

It will be seen, from our previous remarks, that the character of both veins has, in these lower regions, assumed more permanent and decisive features. The impress of the action of heat on the entire mineral gangue becomes now apparent. The inclosing rocks even assume a modified character. The composition of the lodes, widened to many feet, possess more and more the characteristics of heat, and of subdued volcanic agency. Their inclosed materials are more cavernous, spongy, distorted, twisted or kneaded, after the manner of scoria, and of a dead black colour; while the walls of the lodes are broken or interrupted by irregular concavities.

Through the kindness of my friend Professor Booth, I have only this day learned another interesting fact, relating to this singular association of mineral substances—that the black colour of the contents of the veins at the lowest depths is due to the black oxide of copper.

The amount of longitudinal excavation at the 160 feet level, including cross-cuts, is about 330 feet. The backs of the two veins contain a superficial area of 25,000 feet, the solid contents of which, between the 100 and the 160 feet levels, probably amounted to 4000 cubical yards, which have been only partially excavated.

The East Lode

Here preserves its character of being the richest in silver. In the explorations that have been recently carried as low as 170 feet, a grey siliceous rock is interpolated with the gangue, and contains flakes and arborescent concretions of native silver. In some assays of this rock but little silver has resulted; in others, it has yielded 80 ounces of silver to the ton of ore. South of the shaft, on this level, the east vein contains a greater amount of the best silver-lead, blended with hard granular zink, than the west vein. In places, this east lode is ten feet wide; but we have to notice here a new feature—that of an intermediate hard rock, rising from below, and apparently dividing the lode into two parts. The hanging wall of the

same vein, at one point to the south, is faced with solid white quartz rock; but extending not more than about 25 feet.

As in all other positions which have been explored, the mineral matter and gangue of the lodes perceptibly diminish to the north and the south, and even seem wholly to terminate before their range is cut off by the cross-courses. We feel bound to record all this minutia.

To the foregoing notes, we have only to add, that the eastern vein maintains its character as the more valuable of the two. We use the phrase two, as customary, but we think we are authorized in numbering four mineral veins in this mine. Very hard zink, with silvery lead interspersed, occurs next to the foot wall or lying side of the lode. But silvery ores occasionally prevail in every part of the vein, especially where galena is present. At 170 feet, the part of the lode which contains most silver, occurs in a breadth of two feet, diminishing upwards. It was here, that on the 3d of February, a few hours after the close of my first report, some of the richest specimens of silver, yet seen in the mine, were discovered and brought to me.

The West Lode, at 160 *feet.*

From the cause, which we have endeavoured to explain, of the converging direction of the cross-courses, the longitudinal capacity of this vein is now greatly contracted. We refer to our ground plan for a more definite illustration. Here also, and on a yet greater scale, the separation of the lode into two, by the interposition of a central rocky mass, characterizes this position. At the main cross-cut from the engine shaft, an additional expansion of seven feet takes place, and the extreme space between the walls now varies from ten to fifteen feet, occupied by an admixture of zink and argentiferous lead ores, and by some less important materials. Longitudinally, however, this vein is shortened between the walls of the cross-courses, and no attempt has been yet made to recover the veins beyond those limits. I venture to suggest an early exploration to determine the extent of the lateral heaves and the point of resumption of the veins. No undertaking could be more

fraught with interest in reference to the future productiveness of the mine than this. The sinking of an additional ten fathoms, already in progress, will be attended with the most important results, not only in a geological sense, but with relation to the economical prospects of the establishment.

It will be seen by our diagrams, that by the combined influence of the convergence of the cross-courses, and the western inclination of the lodes, the latter must, at the depth of some fifty feet, be brought absolutely to the point of radiation, and that every existing difficulty must then be explained. In addition to this, there is every appearance that, at the same level, a junction will take place with the small vein cut through in the lower cross-cut, and thus that a material enrichment of mineral matter will take place at the point indicated.

Our diagrams explain, what perhaps we have quite sufficiently stated, that the inclination of the metalliferous veins increases perceptibly in descending into the earth. More especially has this tendency to verticality exhibited itself at the 160 feet level. We again allude to that circumstance now, with reference to the possible influence it might have upon the future richness of the contained ores.

It has been maintained, by good authority, as a general law, that a considerable underlie or flatness of mineral veins is unfavourable to their enrichment; and that in the same veins, where the underlie differs much, it is almost invariably found that the most perpendicular parts are the most productive. "We may, therefore," remarks an excellent practical observer, "deduce this general conclusion—that, although veins are very seldom quite perpendicular, yet that *an approach to perpendicularity is a circumstance favourable to their enrichment.*"*

The argentiferous veins in the Washington mine, occurring as they do in the midst of that class known as "the inferior stratified rocks," belong to what are denominated "contemporaneous veins, or veins of segregation." It has been shown, that the increased productiveness of a large proportion of this

* Mr. Burr on metalliferous and mineral deposits, in the Mining Review.

series of veins, "seldom commences at a less depth than forty or fifty fathoms from the surface, and that the portions most highly enriched, prevail for about one hundred, or from that to one hundred and fifty fathoms below this point."* In those cases, where the enrichment of the lode commenced nearer to the surface than we have designated above, a diminution or decline of produce is observable to take place at from fifty to one hundred fathoms in depth.

I have thought these observations, as coming from good practical authority, sufficiently deserving of note in the present case; although I do not undertake, at the present moment, to designate the particular class of productive veins to which the Washington veins most assimilate.

The effective mining force of the establishment is, at this moment, engaged in the two operations of deepening the east shaft, and in sinking a small exploration shaft from the surface, in search of the mineral lodes beyond the limits of the present works, northward. Recent accounts, with regard to the latter, anticipate a successful issue. A third mode suggests itself in pursuing, south-easterly, the little vein, intersected in the lower cross-cut, which vein seems to point in the supposed range of the southern disturbance. Some important facts may be elicited by this means, and new ground will be investigated at small expense. We are by no means certain that this vein, which here is beyond the influence of the northern cross-course, may not afford a clue to the nature of the lateral heave on that north side. Neither can we be quite sure that this vein is not itself one of the lodes we seek.

It will be seen, by the annexed table, that the value of the gold contained in the silver, forms a very important item in the returns of this mine.

* Burr.

Copy of Mint Certificates of the value of the Metal from the Washington Mine, North Carolina, from October 13, 1843, to December 31, 1844.

Dates.	Test Bottoms.	Silver.	Gold Extracted.
	Ounces. Dec.		
1843, December 9,	366.70	$464 64	$121 28
" " 19,	367.40	463 13	129 12
1844, January 6,	476.90	593 80	177 45
" " 19,	523.10	634 41	173 02
" February 24,	690.40	834 62	271 16
" March 25,	1622.00	2037 35	494 49
" " 28,	1386.30	1718 17	563 39
" April 1,	907.00	1122 27	393 73
" " 6,	1045.80	1317 00	270 23
" " 13,	211.60	285 79	148 73
" " 26,	280.50	347 99	136 26
" May 4,	1919.90	2415 07	416 73
" " 10,	1431.40	1773 27	362 43
" " 18,	892.50	1090 44	295 20
" " 20,	112.30	136 03	29 02
" June 21,	265.40	332 51	93 26
" July 29,	918.40	1145 89	351 22
" August 1,	573.60	711 56	207 50
" September 7,	1149.20	1441 28	534 51
" " 21,	663.30	823 27	301 66
" October 22,	183.90	223 13	114 05
" November 4,	326.80	388 71	358 05
" " 23,	696.60	881 28	100 80
" December 9,	826.30	1014 92	478 27
" " 20,	1475.70	1812 54	732 13
	19313.00	$24,009 07	$7253 69

N. B.—The expense of parting the gold from the silver, is not deducted in this statement. The above amount of silver was produced from about 160,000 lbs. of lead, making an average produce of over 240 ounces of silver to the ton of 2000 lbs. of lead.

As in all business calculations, especially those relating to the profits of mining, a single well determined fact will outweigh in value a volume of speculations, I subjoin the fol-

lowing memorandum from the President of the Mining Company, received since the foregoing pages were written.

Dear Sir,

I delivered 4277 lbs. of argentiferous lead from our mine to the refining furnace on Monday last; from which I forwarded to the United States mint a "test bottom" of silver, weighing 850 ounces. The returns from the mint this morning, give the value of this silver at $1053 15, and of the gold extracted $446 10.

Yours respectfully,

Wm. Blackburne,
President W. M. Co.

Mr. R. C. T.

Philadelphia, Feb. 27, 1845.

The foregoing notes comprise nearly all the data which are required in completing this report.

Viewing this undertaking and the details of its arrangements, internal and external, as interesting to science, I cannot but repeat the expressions of gratification which its examination has afforded me. Extending the investigation to the more rigid test required by the economist, the facts which have been elicited in the progress of the enquiry, may be left to speak for themselves. To the writer, at least, they afford records of past productiveness, of present remunerativeness, and reasonable anticipations of future prosperity. He may, therefore, leave, with some confidence, the reader to form his own estimates, and the holders of the stock to draw their own conclusions, always bearing in memory the casualties and uncertainties inseparable from all mining enterprises.

Respectfully,

Richard C. Taylor.

Philadelphia, March 11, 1845.

Analyses of various ores of Lead, Silver, Copper, &c., from the Mine of the Washington Mining Company in Davidson county, North Carolina, conducted in the Laboratory of James Booth and M. H. Boyé.

Having received specimens of the vein only, and none from the adjoining formations, we are unable to give its geological position. The main body of the working vein (in the first hundred feet) appears to consist of carbonate of lead, so far as it concerns the valuable portion of the vein.

Besides this, we have also zink, copper, silver, iron, manganese, silica, alumina, and magnesia; the two former, as sometimes the lead, being in the state of sulphurets, as well as carbonates. The silver occurs in the metallic form, rarely sulphurated, and the iron and manganese as oxides, constituting with silica, alumina, and magnesia, the gangue.

No. of specimens assayed.	Silver.	Lead.		Carbonate of Copper.	Sulphuret of Zink.	Peroxide of Iron.	Oxide of Manganese.	Alumina.	Magnesia.	Silica.	Total.
		Carbonate.	Sulphuret.								
1.	12.51	55.15			3.32	14.25	trace.	2.47	2.83	10.92	101.35
Metals.	12.51	46.14			2.23	9.88					70.76
2.	11.14			8.88		7.50		30.40	9.07	32.29	99.28
Metals.	11.14			4.55		5.20					20.89
3.			0.81	54.27	23.86	8 32		1.96		10.20	99.42
Metals.			0.70	36.08	15.92	5.77					58.47
4.	0.54	64.70		trace.	2.60	14.40	1.40	3.70	1.00	12.40	100.74
Metals.	0.54	49.86			1.78	10.05	0.98				63.21
5.		43.60		3.30		15.00	5.60	9.27	6.63	14.49	97.89
Metals.		36.39		2.10		10.40	3.91				52.80
6.	0.05		5.30	25.50	41.30	7.15		0.60	1.60	20.00	101.50
Metals.	0.05		4.59	16.60	27.56	4.96					53.76
7.	0.5	1.8		48.2		10.4		5.2	13.7	20.00	99.8
Metals.	0.5	1.5		29.8		7.2					39.0
8.		81.80				12.0		1.1	0.4	3.12	98.42
Metals.		62.82				8.32					71.14
9.		56.4		2.63	0.17	18.6	trace.	3.66	6.17	10.58	98.21
Metals.		43.75		2.50	0.14	12.9					59.28
10.		62.21			6.0	23.7	trace.	trace.	3.1	4.0	99.01
Metals.		48.21			4.0	16.43					68.64
11.		59.83			3.78	5.20		9.7	9.42	12.5	100.43
Metals.		46.36			2.53	3.61					52.50
12.							sulph.	31.51			
Metals.			17.44		38.38	11.3					66.82
13.											
Metals.	2.79		38.7								41.49

In the above table, 1, 4, 5, 8, 9, 10, 11, are carbonates of lead, with variable quantities of the other metals, the greater part of which are either oxides or carbonates. 2 contains the silver disseminated through a talcose gangue. 3 and 7 contain the metals chiefly in the state of sulphurets, but their black colour is due to oxide of copper. In 6 the zink and lead are sulphurets; the copper is a mixed carbonate, oxide and sulphuret. 12 and 13 were only subjected to a partial analysis; they are mixed galena and blende. It being not required in the first 11 specimens to look for gold, there is no mention of it in the table, although it was subsequently found at the United States mint, and in the company's refining establishment.

—

I take the liberty of adding to the very concise, yet not the less valuable, report of Messrs. Booth and Boyè, that their analyses, as comprised in the foregoing tabular statement, includes the principal combinations of the Washington mine ores, particularly in the upper levels. It must be obvious, that it was impossible to submit to the inspection of those scientific gentlemen, every variety and modification of mineral matter, as it occurred in the mine. Nor has it been found necessary, inasmuch as assays are now almost daily made in the laboratory of the company, at the mine, independent of the constant examination to which those ores are subjected, on the large or working scale, at the company's smelting and refining furnaces.

R. C. T.

Extract from a Report, and from subsequent informal statements, made by the Managers of the Washington Silver Mine, December 7, 1842, *to September* 7, 1844.

This company holds its charter from the state of North Carolina, in which charter are embraced privileges of an advantageous character, for the period of fifty years, commencing January 7th, 1839. The capital stock is $500,000, divided into 5000 shares of $100 each.

The mine is situated in Davidson county, North Carolina, ten miles south-east of Lexington.

The estate, in which the mining establishment is situated, and on which about sixty buildings have been erected, contains 466 acres, and was conveyed to the company August 20th, 1840, by Roswell A. King, for $479,500. Subsequently, a small adjoining tract, of six acres, with a log dwelling-house, has been added to the property.

It is unnecessary to quote here the anticipations of interest which the mine would yield to the employment of a given capital. That which was prospective and conjectural only in 1842, has been more than realized by the official returns, which we annex, of 1844.

In the descriptive portion of the report of 1842, it is stated that, at *the forty feet level*, the yield of the ore, when dressed, was about 50 per cent. of lead, and from 20 to 120 ounces of silver to the ton of lead. The value of the silver varied from $1 80 to $2 80 per ounce; its price being enhanced by the large proportion of gold found in combination with it, at this depth.

At the sixty feet level, the ore increased in richness, but was irregular in its value. At its best and most remarkable points, it yielded as much as 5000 ounces to the ton. Such points were, however, few and small, forming exceptions to the prevailing richness of the lode. The general average is stated to be 126 ounces of silver to the ton of metal. Here the sulphuret of lead, or galena, was first met with, in small

quantities; but the bulk of the ore continued similar to the 40 feet level, being a carbonate of lead, with the exception of the proportion of gold, which gradually diminished, but was recovered again at the 160 feet level.

Arriving at *the hundred feet level*, the galena predominated; but, in other respects, the mine presented the same aspect as at the 60 feet, increasing in regularity.

At *the one hundred and sixty feet level*, the vein is nearly all sulphuret, as regards the lead, and the area is enlarged. It was estimated, that this argentiferous ore, locally termed "the black ore," produced on an average from $87 50 to $100 per ton, in equal proportions as to value of the lead and the silver, after deducting the expenses of smelting. It was here that some masses of extraordinary rich blue galena were met with, worth at the rate of $1000 per ton. We do not lay an unnecessary stress upon this flattering circumstance, but it is too interesting and important a fact to be passed without record.

The Washington mine is situated about eighty miles from Raleigh, the capital of the state, and the present terminus of the great chain of rail-road from the north. It is also one hundred miles from Fayetteville, the head of sloop navigation on Fear river. The cost of transportation from the mine to Philadelphia, has been generally 85 cents per 100 lbs., and has not exceeded $1 00.

From the commencement of the mining operations up to November 1st, 1842, a period of 27 months, the actual product was 2661 pigs of argentiferous lead, yielding silver and gold to the amount of $13,288 68, this being the net value after deducting the charges of the United States mint for separating the gold from the silver, and alloy requisite to reduce it to the standard of coinage.

The litharge necessarily made in obtaining these results, has net the sum of $5499 11. Thus these items form an aggregate product of $18,787 79. The period embraced by this return was one of heavy expense, in erecting buildings and machinery, in sinking the engine shaft, in carrying forward the cross-cut, in expensive explorations, and in much costly dead work, to which the attention and energy of the company

was necessarily directed, at a total outlay of $29,824 84. This heavy preliminary outlay being completed, the company will be left in future to the more agreeable business of excavating and smelting the profitable ores of the veins.

The land, for agricultural purposes, is of inconsiderable value; but it is of great service to the company in furnishing a constant supply of timber.

R. C. T.

March 11th, 1845.—By a report from the Managers of the mine, it appears that the little east vein has been reached while sinking the middle shaft, as was anticipated. This is at about 180 feet from the surface, and silver was obtained. The fact is of some importance in establishing the continuity of that vein, as suggested at page 19.

Copy of Minutes of the Annual Meeting of Stockholders, January 9th, 1845.

At a stated meeting of the stockholders of the Washington Mining Company, held on Thursday, the 9th of January, 1845, the President, William Blackburne, Esq., in the chair; the meeting being called to order, the Secretary presented the accompanying reports, which, on motion of F. Blackburne, seconded by J. Taylor, Jr., were ordered to be recorded on the minutes, and 100 copies printed for the use of the stockholders.

On motion of D. Williamson, seconded by Francis Blackburne, the meeting then proceeded to the election of Directors for the ensuing year, when the following gentlemen were duly elected.

W. Blackburne, D. Williamson,
John Taylor, Jr. Geo. Greenfield,
Roswell A. King.

The meeting was then adjourned.

Wm. Bkackburne, *Chairman.*

Francis Blackburne, *Secretary.*

The Subscribers beg leave most respectfully to

REPORT:

That they have great satisfaction in being able to lay before you the following statement of the business of the company, showing, that after a long series of reverses and mismanagement, the last period has been sufficiently successful to warrant a belief that the stock of the company will ere long yield a good interest on the investment.

The new board of superintendents obtained possession on the 13th of October, 1843, and this statement includes from

that time up to the 1st instant, during which time the produce of the mine has been in all $40,379 47, viz:

Amount of Silver received,	- -	$30,902 70
" Lead "	- - -	3,589 27
" Scoriæ "	- - -	2,550 76
" Silver in port,	- -	1,478 65
" Lead "	- - -	630 18
" Litharge "	- - -	75 00
" Metal and Scoriæ in transmission,		1,152 91
		$40,379 47

When the new system of management went into operation, the company were indebted to various persons to the amount of $32,995 90, viz:

Deed of Trust to Taylor & King, - -	$23,739 38
Wm. Blackburne and J. Taylor, Jr. - -	4,781 60
Due for work, materials, rent, &c. - -	4,474 92
	$32,995 90

Since which time there has been paid off in liquidation,

Towards the deed of trust, - - -	$2,409 70
And the floating debt, as above, - -	4,474 92
	$6,884 62

Leaving the amount still to be paid $26,111 28, towards paying of which the company have the following assets, besides the mining property, viz:

Cash on hand, in Philadelphia, - - -	$2,549 86
" due from G. Greenfield & Co. - -	755 49
" at the mine, - - - - -	80 16
" mailed, Dec. 29th, for the mine, -	300 00
Silver and lead on hand, - - - -	2,108 81
Metal on the way, assayed at - - -	1,152 91
Litharge on hand, - - - - -	75 00
Merchandise on hand at the mine, - -	1,540 50
Material on hand at the mine, - - -	1,272 23
	$9,834 96

From this is to be deducted the balance owing at the mine, and the salaries of the president and superintendents, amounting in all to about two thousand dollars; all other claims against the company being pretty much discharged.

The amount actually received is, as previously stated, $37,042 73, and has been disbursed as follows, viz:

Towards paying off the debt, (this is exclusive of $309 70, settled at the mine,)	$6,574 92
Expenses in Philadelphia, and smelting and refining,	7,060 59
Hauling and freight account,	2,081 57
Advance to Stuart & M'Gary,	187 27
Cash and merchandise sent to the mine,	16,779 07
" on hand,	2,549 66
" paid Geo. Greenfield and Jas. Bell, in advance,	1,000 00
" due from Geo. Greenfield & Co.	755 49
" paid Geo. Greenfield & Co. for smelting and refining,	53 96
	$37,042 73

We annex a communication from the Superintendents, Messrs. Greenfield and Bell, exhibiting the prospects of the mine at the present time.

As a whole, the foregoing facts show a clear profit, over and above paying all expenses, of upwards of $14,000, and when are considered the disadvantageous circumstances under which the new superintendents commenced their operations, and the expensive alterations and additions that were requisite to be made at the works, it must be confessed that their success has been very flattering, and bears good promise for the future.

(Signed,) Wm. Blackburne, *President.*

O. P. Blackburne, *Secretary.*

Philada., Jan. 9, 1845.

January 1st, 1845.

TO THE PRESIDENT AND DIRECTORS OF THE WASHINGTON MINING COMPANY.

We consider it necessary to lay before you a brief statement of our proceedings, since taking possession of the mine, and the present situation thereof.

Since the 13th of October, 1843, we have worked up all the ore then on hand, and have taken out the principal part of the ore between the 60 and 100 feet levels, likewise a considerable quantity between the 100 and 160 feet levels; still there is a large quantity to be taken out at this point, which will prove to be profitable; there is still a large quantity of ore above the 40 feet level, which can be profitably removed. The slag which was upon the ground when we took possession, has been all worked up, except a small quantity which remains at the small furnace. There is a large quantity of ore upon the top, which can be selected, and, in our opinion, can be profitably worked; likewise a large quantity of topings or refuse from the washing ground, which we are confident can be worked to good advantage, as soon as convenience can be had to crush them. At the beginning of October we took out all the water from the mine, and commenced operations at the lowest depth, viz: 160 feet. Much to our satisfaction we then found a most valuable deposit of metallic silver, and continued working upwards until we opened into an old working, which had been commenced from the 100 feet level; as we proceeded upwards we found the ore poorer. On the 27th of December, workings were commenced at the 160 feet level, immediately below where the deposit of silver was found, and from accounts there is good reason to expect a continuation of valuable ore. At this point gold has been found, which is entirely a new feature, and holds forth good grounds to expect profitable results. It is desirable, and we here recommend, that the working should

be continued downwards; the water shaft must be sunk deeper, say 40 feet further. Whether this can be done by means of our present facilities, is a question; but if not, a steam engine will be necessary to pump the water, and likewise to crush our ores, which will be a great acquisition. We would here mention, that the vein from which we procured the metallic silver, we call the south vein; the north vein we have not touched since we have worked below; there is a large mass of ore there, which is of good value.

It is likewise recommended that a series of trials should be made from above, in the vicinity, in the hope of finding another vein similar to that already found. The expense attending this will be comparatively small with the results reasonably expected.

We have used every means in our power to improve the condition of your establishment by improvement in different ways. The dwelling-houses have been repaired and rendered more comfortable for the workmen. We have built several excellent and convenient houses; we have expelled several dissipated and unruly characters from our neighbourhood; we have encouraged industry and sobriety, and are most happy to say that the present condition of the place is better than we could reasonably expect. The establishment of a store has answered a good purpose; it has given great satisfaction to your workmen and the country around us. We confidently assure you that its success is a matter of great importance as a source of revenue to the company. In conclusion, we congratulate the company upon the favourable result of the past year's labours, and upon the good prospects before them.

(Signed,)

James Bell,
Per Geo. Greenfield.
Geo. Greenfield.

AN ACT TO INCORPORATE THE WASHINGTON MINING COMPANY.

1. *Be it enacted by the General Assembly of the State of North Carolina, and it is hereby enacted by the authority of the same,* That there shall be established in the county of Davidson a mining company, by the name and style of the Washington Mining Company, with a capital of five hundred thousand dollars, divided into shares of one hundred dollars each. That Roswell A. King, and John W. Thomas, and such other persons as they may associate with them, are hereby appointed commissioners, and are authorized at such time and places, as they or a majority of them may deem proper, after ten days public advertisement of the same, to open books for the purpose of receiving subscriptions for shares of stock in said corporation; and that the said commissioners are hereby authorized to receive in payment, or part of payment of stock subscribed, any mining property, at such valuation as they may deem just and reasonable; and that upon and at the time of subscribing, the sum of five dollars upon each and every share shall be paid to such commissioners.

2. *Be it further enacted,* That after the said stock shall have been subscribed, the commissioners aforesaid, or a majority of them, shall call a meeting of the subscribers, by giving at least ten days public notice, who shall personally or by proxy, proceed to elect five directors; and they from among themselves shall appoint a president, who, together with the other directors, shall have power to make all rules, regulations, and by-laws necessary for the management and well-being of said company; and in all general meetings of the stockholders, whether personally or by proxy, they shall vote in proportion to the number of shares they respectively own.

3. *Be it further enacted*, That the president and directors shall have power to call in, from time to time, as they may deem expedient, by instalments, the whole or any part of the capital stock, subscribed as aforesaid, and in case of the refusal or failure to comply with such requisition by any subscriber, the stock of such subscriber, together with the sum or sums theretofore paid by him, shall be forfeited to the company, and the said capital shall be considered as personal property, and shall be assignable and transferable, under such rules and regulations as shall be prescribed by the by-laws of said company.

4. *Be it further enacted*, That when the sum of twenty thousand dollars shall have been paid in, and not before, the stockholders, their successors and assigns, are hereby declared to be incorporated, by the name and style of the "*Washington Mining Company*," and shall continue to exist as such for the period of fifty years, and may sue and be sued, plead and be impleaded, and possess and enjoy all the rights and privileges of a corporation or body politic, and also to make, have and use a common seal, and the same to break, alter and renew at pleasure: *Provided*, that the business of the company shall be confined to the purpose of mining.

5. *Be it further enacted*, That the stockholders shall meet annually, at such place as the directors shall deem most convenient for the stockholders, for the purpose of electing five directors from their body, which directors shall appoint one of their own number as president, who, with the other directors, shall appoint the other officers of the said company, and make rules and regulations for the management of the same.

6. *Be it further enacted*, That any legal process against said corporation, may be served on the president thereof, or in case he is out of the state, service of the same on any director, or if there be no director in the state, service of the same on any stockholder shall be sufficient, and the property of the corporation, of whatever kind or nature, shall be liable to the

satisfaction of the debts of said corporation, and be subject to be levied on by execution, attachment, or other legal or equitable process, and sold.

7. *Be it further enacted*, That this Act shall take effect and be in force immediately from and after the ratification thereof.

Read three times, and ratified in General Assembly this the 7th day of January, A. D. 1839.

(Signed,) WILLET GRAHAM, S. H. C.
A. JOYNER, L. S.

—

State of North Carolina.

Secretary of State's Office.

I, William Hill, Secretary of State, in and for the State aforesaid, do hereby certify that the foregoing is a true copy of an Act of the General Assembly of this State, drawn off from the original on file in this office.

Given under my hand this 12th day of February, 1839.

(Signed,) WM. HILL.

—

THE STATE OF NORTH CAROLINA.

To all to whom these Presents shall come, Greeting:

Be it known, that William Hill, Esqr., whose signature appears in his own proper handwriting to the annexed certificate of the copy of an Act of the General Assembly of this State, was, at the time of signing the same, and now is *Secretary of State*, in and for the said state, and as such, he is duly qualified and empowered to give said certificate, which is here done in the usual and proper manner, and full faith and credit

are due to the same, and ought to be given to all the official acts of the said William Hill, Secretary as aforesaid.

In testimony whereof I, Edward B. Dudley, Governor, Captain-General, and Commander-in-Chief, have caused the great seal of the State to be hereunto affixed, and signed the same at the City of Raleigh, on the 22nd day of March, in the year of our Lord one thousand eight hundred and thirty-nine, and in the 63d year of the Independence of the United States.

[L. S.]

(Signed,) EDWARD B. DUDLEY.

By the Governor.

(Signed,) CHRISTOPHER C. BATTLE,
Private Secretary.

GROUND PLAN OF THE 60 FEET LEVEL

GROUN

GROUND PLAN OF THE 100 FEET LEVEL.

Lith of T. Sinclair Philad.a

GROUND

GROUND PLAN OF THE 160 FEET LEVEL.